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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,696	02/27/2004	Stephen M. Potter	3566	9300
22474	7590	05/23/2006	EXAMINER	
DOUGHERTY CLEMENTS 1901 ROXBOROUGH ROAD SUITE 300 CHARLOTTE, NC 28211			MCNELIS, KATHLEEN A	
			ART UNIT	PAPER NUMBER
			1742	

DATE MAILED: 05/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/789,696	POTTER ET AL.	
	Examiner Kathleen A. McNelis	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 06 March 2006.
- 2a) This action is FINAL.                                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-5 and 8 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-5 and 8 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date: _____
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
Paper No(s)/Mail Date: _____	6) <input type="checkbox"/> Other: _____

### **Claims Status**

Claims 1-5 and 8 remain for examination wherein claims 1 and 8 are amended.

### **Status of Previous Rejections**

The previous rejections of claims 1-5 and 8 under 35 USC 103 have been withdrawn in view of applicants' amendments to the claims.

### **DETAILED ACTION**

#### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Villarreal-Trevino et al. (U.S. Pat. No. 6,395,056) in view of Lotosh et al. (U.S. Pat. No. 4,049,435) and Becerra-Novoa et al. (US patent 5,445,363).

With respect to claims 1 and 2, Villarreal-Trevino et al. discloses a method for reducing iron oxide that includes a preheating step in a non-reducing (preferably oxidizing) atmosphere (abstract) as in amended claim 1. Villarreal-Trevino et al. discloses that the invention applies to lumps of iron ore (col. 2 lines 66-67). Villarreal-Trevino et al. teaches that the in prior art methods where ore is heated from ambient temperature to operating temperatures in reducing conditions, longer heating times resulted in greater weakening of the ore (col. 2 lines 5-19). An objective in the method of preheating as taught by Villarreal-Trevino et al. is to avoid the formation of fines in the reactor shaft (col. 2 lines 48-55 and col. 3 lines 18-22). Villarreal-Trevino et al. teaches preheating materials in a hopper by contacting the feed material with oxidizing gases up to a temperature of at least 700 °C prior to feeding into the reduction zone of the reactor (col. 4 lines 19-37). While Villarreal-Trevino et al. does not specifically teach that the temperature of the

preheated material is increase to about 750 °C within the first 20 minutes of charging to the furnace as in instant claim 1, examiner contends that this would be the case, since the feed is heated to at least 700 °C prior to charging.

Villarreal-Trevino et al. does not teach preheating and pre-drying lump feed in a temperature range of from about 200 to 500 °C as in amended claim 1.

Lotosh et al. discloses a method for obtaining a lump product by a two stage heat treatment (abstract) wherein the strength of the finished product is increased (col. 2 lines 49-52). This method of pretreatment allows for accelerated drying and hardening, which prevents problems associated with prior art methods such as sticking (col. 1) and also provides strengthening, which prevents destruction or “cracking” (col. 2). In examples 2 (col. 6 lines 35-45) and 4 (col. 6 lines 46-54) Lotosh et al. discloses the results of heating to a temperatures of 200 °C and 400 °C respectively, and reports both drying and strengthening of the lump feed in both examples. It would have been obvious to one of ordinary skill in the art at the time the invention was made to heat to 200 °C or 400 °C, the feed material of Villarreal-Trevino et al., since Lotosh et al. teaches that this pretreatment step provides drying and strengthening of the feed. One of ordinary skill in the art at the time the invention was made would expect that strengthening the lump to prevent destruction or “cracking” would also minimize the formation of fines within the furnace, which is an objective of Villarreal-Trevino et al.

Villarreal-Trevino et al. in view of Lotosh et al. does not specifically state that the feed storage bin is enclosed or that the means for transporting the heated feed material to the furnace is insulated. Since gas streams are injected into and collected from the feed storage bin in Villarreal-Trevino et al. (Figure 5, (14) gas inlet and (24) gas outlet), it is implicit that the bin is enclosed.

Villarreal-Trevino et al. does not disclose that piping **26** is insulated, but this feature is conventional as evidenced by Becerra-Novoa et al which discloses an apparatus for reducing ore comprising piping **38** which is insulated to conserve energy (col. 13, lines 55-60). It would have been obvious to one of ordinary skill in art at the time the invention was made to insulate the piping in Villarreal-Trevino et al. in view of Lotosh et al. in order to conserve energy as disclosed by Becerra-Novoa et al.

With respect to claims 3 and 4: Villarreal-Trevino et al. teach that preheating is accomplished in a feed storage bin (hopper, Figure 1 and col. 4, lines 22-24). A hot non-reducing gas stream is provided by combustion of fuel and waste off-gases with air (Col 4, lines 25-32). While Villarreal-Trevino et al. are not explicit as to the temperature of the gas as it enters the pre-treatment chamber, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the heating gas at a temperature sufficient to reach the required preheating conditions as discussed above regarding claims 1 and 2.

With respect to claim 5: Villarreal-Trevino et al. teach a process option (Figure 5), which includes a reformer (69) to produce the reducing gas (col. 4, lines 12-34). The reducing gas is fed to the furnace (**30**), then waste off-gases are removed from and cooled in a heat exchanger (**44**), then either returned to the reformer, treated in another manner, or combusted as part of the fuel for the pretreatment system (Figure 5). The applicant's use of the phrase "associated with" is interpreted to mean anywhere in the system as opposed to directly connected to.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Villarreal-Trevino et al. (U.S. Pat. No. 6,395,056) in view of Lotosh et al. (U.S. Pat. No. 4,049,435) and Becerra-Novoa et al. (US patent 5,445,363) alone or in view of Weedon et al. (June 2000).

Villarreal-Trevino et al. in view of Lotosh et al. and Becerra-Novoa et al. is applied as discussed above regarding claim 1.

While Villarreal-Trevino et al. in view of Lotosh et al. and Becerra-Novoa et al. does not specifically teach that the feed material is heated to about 750 °C within the first ½ meter of descent in the furnace, it is the examiner's position that this would be the case, since Villarreal-Trevino et al. teaches pre-heating to a temperature of above 700 °C as discussed above regarding claim 1.

Alternatively, Villarreal-Trevino et al. in view of Lotosh et al. and Becerra-Novoa et al. does not disclose that the heating to 750 °C occurs while the feed material descends the first half-meter in the furnace.

Weedon et al. discloses results of modeling iron ore degradation (abstract) wherein the results of previous testing is summarized. Weedon et al. teaches that previous testing shows that the longer distance ore falls the greater the percentage of fines produced, with falls of 1 m or less reducing the amount fines formation (p. 197). It would have been obvious to one of ordinary skill in the art at the time the invention was made to reduce the height of ore drop to 1 m or less as taught by Weedon et al. into the reducing furnace of Villarreal-Trevino et al. in view of Lotosh et al. to minimize the amount of fines formed by the drop as taught by Weedon et al. The range of 1 m or less overlaps with the claimed range of ½ meter. It would have been obvious to one of ordinary skill in the art at the time the invention was made to reduce the drop to within ½ meter since Weedon et al. teaches that smaller drops generally result in less formation of fines. By minimizing the drop distance, the generation of fines from ores will be reduced in the furnace of Villarreal-Trevino et al. in view of Lotosh et al. and the ore will also reach operating temperature within the first ½ meter of descent into the furnace.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Beggs et al. (U.S. Pat. No. 3,365,339) is cited as evidence that it is known in the art that predrying of magnetite ore "balls" to a temperature of between 500 and 600 ° F (about 260 to 316 ° C) helps to avoid cracking and exfoliation of the balls by strengthening (col. 2 line 65 – col. 3 line 24).

***Response to Arguments***

Applicant's arguments with respect to claims 1-5 and 8 have been considered but are moot in view of the new ground(s) of rejection. Since the rejection grounds are still based on disclosures from Villareal-Trevino et al. and Weedon, applicant's arguments related to these references are addressed below.

With regard to arguments related to Villareal-Trevino et al., applicant contends that the preheating step of Villareal-Trevino et al. is preformed in a reducing environment. Examiner disagrees. A specific objective of Villareal-Trevino et al. is to prevent the weakening of lumps and pellets by the reduction reaction from hematite to magnetite. This is achieved by pre-heating in an oxidizing atmosphere to preserve the crystalline (hematite) structure (col. 2 lines 1-19).

With regard to arguments related to Weedon, the applicants argue that the ½ meter fall limitation in claim 8 is not related to drop strength of the lump but on temperature flux and how quick heating reduces the formation of fines. It is examiner's position that the temperature flux is addressed in the primary reference Villareal-Trevino et al., first in discussions of the prior art limitations (col. 1 line 63 – col. 2 line 45) wherein the slow heating of ore in an reducing environment is identified as a cause of pellet weakening, then in regard to the inventive process pre-heating steps as discussed above. Further, Lotosh teaches the relationship between heat treatment and strength as discussed above. Weedon is therefore not relied upon to teach the

relationship between thermal flux and fines, but instead introduces the teaching that the drop distance is related to fines. If the distance requirement in claim 8 is related only to heating time, then examiner contends that there is no substantive difference between claim 1 and claim 8, and claim 8 stands rejected by Villarreal-Trevino et al. (U.S. Pat. No. 6,395,056) in view of Lotosh et al. (U.S. Pat. No. 4,049,435) and Becerra-Novoa et al. (US patent 5,445,363).

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathleen A. McNelis whose telephone number is 571-272-3554. The examiner can normally be reached on M-F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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